

We claim:

1. Apparatus for die cutting of a segment of material carrying at least one position-identifying indicium, said apparatus comprising:

a die cutting station including an anvil and an adjacent cutting die assembly
cooperable for receiving said segment therebetween and die cutting of
the segment;

means for initially feeding said segment into said station between said anvil and
assembly for permitting said segment die cutting therein; and

positioning means for accurately positioning said segment in said station after
said segment is initially fed thereto and prior to said die cutting thereof,
with said indicium located in a desired position relative to said die
cutting assembly, said positioning means including—

means adjacent said anvil for holding said initially fed segment;

a reference assembly providing reference data corresponding to said
desired position for said indicium;

means for comparing the location of said segment indicium with said
reference data after the segment is held by the holding means;
and

motive means operably coupled with said segment-holding means for
moving said segment holding means and the segment held
thereby to locate said indicium in said desired position.

2. The apparatus as set forth in claim 1, said segment of material being a
part of a continuous web of said material, said feeder including structure for suc-
cessively feeding said web so as to position individual segments of the web for die cutting
in said station, and for thereafter shifting the die cut web remainder from the station.

3. The apparatus as set forth in claim 1, said segment of material being a
sheet of material, said feeder including structure for successively feeding individual
sheets of the material into said station for die cutting thereof, and for thereafter shifting
the cut sheets away from the station.

4. The apparatus as set forth in claim 1, said die cutting assembly being
positioned above said anvil.

5. The apparatus as set forth in claim 1, said segment-holding means including a vacuum hold-down plate adjacent said anvil for holding said segment.

6. The apparatus as set forth in claim 1, said motive means comprising a plurality of spaced apart motors operably coupled with said segment holding means for moving the segment moving means and the segment held thereby in order to locate said indicia in said desired position, each of said motors being translatable during said movement of the segment-holding means.

7. The apparatus as set forth in claim 6, each of said motors including a rotatable output shaft, there being an input shaft operatively coupled to said segment holding means for each motor, and coupling structure for eccentrically interconnecting each motor output shaft with the corresponding input shaft.

8. The apparatus as set forth in claim 7, there being three of said motors and three corresponding input shafts, the axes of each of said input shafts lying in a single, common rectilinear line.

9. The apparatus as set forth in claim 1, said reference assembly comprising at least one reference indicium fixed relative to said cutting die assembly.

10. The apparatus as set forth in claim 9, there being two spaced reference indicia carried by said cutting die assembly.

11. The apparatus as set forth in claim 1, said comparing means including a computer controller operably coupled with said reference assembly and said motive means.

12. The apparatus as set forth in claim 1, said anvil being essentially stationary, said segment holding means disposed about said anvil.

13. The apparatus as set forth in claim 12, said segment holding means comprising a vacuum plate with a plurality of vacuum apertures therethrough and disposed about said anvil.

14. Positioning apparatus adapted to form a part of a processing station for processing of a segment of material fed to the station, said segment carrying at least one position-identifying indicium thereon, said positioning apparatus being operable for adjusting the position of said segment with said indicium located in a desired position within the station, said apparatus comprising:

means for holding said segment after feeding thereof to said station;
a reference assembly providing reference data corresponding to said desired position for said indicium;
means for comparing the location of said indicium with said reference data after the segment is held by the segment-holding means; and
motive means operably coupled with said segment-holding means for simultaneously moving said segment-holding means and the segment held thereby to locate said indicium in said desired position.

15. The apparatus of claim 14, said segment being a part of a continuous web, said segment-holding means operable for holding the segment of the continuous web, said motive means moving said held segment while the segment remains a part of the continuous web.

16. The apparatus of claim 14, said segment being a discrete sheet of material, said segment-holding means operable to hold the discrete sheet.

17. The apparatus of claim 14, said station being a die cutting station including a shiftable die cutting assembly and a stationary anvil, said die cutting assembly disposed above said anvil, said segment-holding means disposed about said anvil.

18. The apparatus of claim 14, said apparatus including a stationary segment-supporting plate disposed about said segment-holding means.

19. The apparatus of claim 14, said segment-holding means including a vacuum hold-down plate.

20. The apparatus as set forth in claim 14, said motive means comprising a plurality of spaced apart motors operably coupled with said segment holding means for moving the segment moving means and the segment held thereby in order to locate said indicia in said desired position, each of said motors being translatable during said movement of the segment-holding means.

21. The apparatus as set forth in claim 20, each of said motors including a rotatable output shaft, there being an input shaft operatively coupled to said segment holding means for each motor, and coupling structure for eccentrically interconnecting each motor output shaft with the corresponding input shaft.

22. The apparatus as set forth in claim 21, there being three of said motors and three corresponding input shafts, the axes of each of said input shafts lying in a single, common rectilinear line.

23. The apparatus of claim 14, said there being a pair of indicia carried by said segment, and a pair of reference indicia fixed with said station.

24. Apparatus for processing of individual segments of a continuous flexible web, comprising:

a processing station including processing means for carrying out an operation upon each of said segments after the segments are initially fed to the station;

means for intermittently feeding successive segments of said web to said station for initial placement therein; and

positioning means for accurate positioning of each of said web segments after said initial placement thereof in said station for said processing thereof, said positioning means including--

means within said station for holding each web segment upon said initial placement thereof; and

motive means operatively coupled with said segment-holding means for adjusting movement of said segment within the station to a desired accurate position for said segment processing,

said adjusting movement of said segment being carried out while the segment remains apart of said continuous web, with the continuous web accommodating said adjusting movement.

25. The apparatus of claim 24, each of said segments carrying at least one position-identifying indicium, said positioning means including a reference assembly providing reference data corresponding to the accurate position of each web segment within the station, and means for comparing the location of said segment indicium with said reference data, said comparing means operably coupled with said motive means.

26. The apparatus of claim 24, said motive means including structure for adjusting movement of said segment holding along orthogonal axis within the plane of said segment, and about a rotational axis perpendicular to said plane.

27. The apparatus of claim 24, said station comprising a die cutting station equipped with a shiftable die assembly and an adjacent, essentially stationary anvil, said feeding means initially feeding said segments between said die assembly and anvil.

28. The apparatus of claim 24, said motive means comprising a plurality of spaced apart motors operably coupled with said segment-holding means, each of said motors being translatable during said adjusting movement.

5 29. The apparatus as set forth in claim 28, each of said motors including a rotatable output shaft, there being an input shaft operatively coupled to said segment holding means for each motor, and coupling structure for eccentrically interconnecting each motor output shaft with the corresponding input shaft.

10 30. The apparatus as set forth in claim 29, there being three of said motors and three corresponding input shafts, the axes of each of said input shafts lying in a single, common rectilinear line.

15 31. The apparatus of claim 25, said reference assembly comprising at least one reference indicium within said station.

32. The apparatus of claim 31, there being a pair of spaced reference indicia within said station.

20 33. The apparatus as set forth in claim 31, said comparing means including a computer controller operably coupled with said reference assembly and said motive means.

34. A method of processing individual segments of a continuous web comprising the steps of:

feeding successive segments of said web to a processing station for initial positioning therein;

accurately adjusting the position of at least certain of such segments within the station prior to processing thereof, said adjusting step comprising the steps of holding each segment and subjecting each held segment to adjusting motion while the segment remains a part of the web, said adjusting motion being selected from the group consisting of motion along either or both of orthogonal axes in the plane of the segment, and rotational motion of the segment about an axis transverse to said plane, and combinations of the foregoing motions, said web accommodating said adjusting motion; and

processing each segment within the station after said accurate adjustment thereof.

35. The method of claim 34, including the step of die cutting each segment after said adjusting movement thereof.

36. The method of claim 34, including the step of holding said segment to a shiftable vacuum plate, and adjusting said plate to effect said accurate adjustment thereof.

37. The method of claim 34, said adjusting step including the step of comparing the locations of a fixed reference indicium within said station with an indicium carried by each of said segments.

38. A method of processing a segment of a continuous web comprising the steps of:

feeding said segment in an axial feeding direction substantially along the longitudinal axis of the web into a processing station for initial positioning therein;

adjusting the position of said segment within said station prior to processing thereof, said adjusting step comprising the steps of subjecting said segment to adjusting movement while the segment remains a part of the web, said adjusting movement being selected from the group consisting of movement in a lateral direction transverse to said axial feeding direction, rotational movement about a rotational axis transverse to said axial and lateral directions, and combinations thereof, said web accommodating said adjusting movement; and processing said segment after said adjustment thereof.

39. The method as set forth in claim 38, said adjustment step comprising the steps of gripping said segment within said station, reducing the tension of said web adjacent the station, and thereafter subjecting said gripped segment to said adjusting movement.

40. The method as set forth in claim 38, said segment carrying a position-indicating indicium, said adjustment step comprising the steps of comparing the location of said segment indicium after said feeding of said segment with a reference indicium within the station, and carrying out said adjusting movement so that the segment is located with said segment indicium in a predetermined relationship relative to said reference indicium.

41. The method as set forth in claim 38, said processing step comprising the step of die cutting said segment.

42. The method as set forth in claim 38, including the steps of successively carrying out said feeding, adjustment and processing steps on successive segments of said web.

43. The method as set forth in claim 38, said adjustment step also including the step of moving said web in said axial feeding direction after said feeding step.

5 44. The apparatus for processing of a segment of a continuous web comprising:

a processing station including means therein for processing said web segment;
means for feeding said web segment in an axial feeding direction for initial
positioning of the segment within the station; and

10 means for adjusting the position of said segment within the station prior to
processing thereof, said adjusting means including structure for
adjusting movement of the segment while the segment remains a part of
the web, said adjusting movement selected from the group consisting of
movement in a lateral direction transverse to said axial feeding
15 direction, rotational movement about a rotational axis transverse to said
axial and lateral directions, and combinations thereof.

20 45. The apparatus as set forth in claim 44, said adjusting means including
structure for adjusting movement of said segment in said axial direction after said
segment is fed to said station.

25 46. The apparatus as set forth in claim 44 including means for gripping of
said segment within the station after feeding thereof, and means for reducing the tension
of said web adjacent the station, for permitting said adjusting movement of said
segment.

30 47. The apparatus as set forth in claim 44 said segment carrying a position-
indicating indicium, said adjusting means including a reference indicium within the
station, means for comparing the location of said segment indicium with said reference
indiciu after feeding of said segment to the station, and means for controlling said
adjusting means for adjusting said segment so that the segment is located with said
segment indicium in a predetermined relationship relative to said reference indicium.

35 48. The apparatus as set forth in claim 44, said processing means comprising
a die cutting assembly.

~~49. The apparatus as set forth in claim 44, said feeding means and adjusting means operable for feeding and adjustment of successive segments of said web.~~

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